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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Jurgen Rabe

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EXAMINER

BASS, DIRK R

ART UNIT

PAPER NUMBER

1797

MAIL DATE

DELIVERY MODE

05/01/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/527,943	Applicant(s) RABE ET AL.	
	Examiner DIRK BASS	Art Unit 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 April 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. The request for reconsideration regarding the Office action mailed 21 January 2009 has been acknowledged. No amendment has been made. In response to Applicants' remarks the examiner modifies rejections.
2. The examiner submits a different version of Shu's reference to provide clearer figures as referenced below.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:
 1. Determining the scope and contents of the prior art.
 2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. **Claims 1-23** are rejected under 35 U.S.C. 103(a) as being unpatentable over Bensimon et al., US 5840862 (Bensimon) in view of Shu et al., "Extremely Long Dendronized Polymers: Synthesis, Quantification of Structure Perfection, Individualization, and SFM Manipulation", *Angewandte Chemie*, Vol. 113, no. 24, pgs. 4802-4805 (2001) (Shu).

Regarding claim 1, Bensimon in view of Shu discloses a method for arranging a polymer molecule such as a biomolecule on a support (see abstract), the method comprising the following steps:

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- a. Providing a substrate having a surface (see “support”, col. 1, l. 48-54 and col. 3, l. 5-7);
- b. Providing a surface layer on said surface of the substrate, said substrate and said surface layer providing a support (col. 3, l. 8-12);
- c. Placing a polymer molecule on said surface layer in a first position (col. 3, l. 24-26); and
- d. Adsorbing the polymer molecule on said surface layer providing an adsorbed state of the polymer molecule, the polymer molecule having a first conformation on said surface layer (col. 3, l. 46-50); wherein said surface layer is configured to adjust predefined molecular interaction between the polymer molecule and said support to allow fixing of the first conformation of said polymer molecule (col. 3, l. 54 – col. 4, l. 7).

While Bensimon discloses a method for molecular manipulation, in which the free end of an anchored molecule is aligned by the passage of a meniscus (col. 4, l. 6-7 and fig. 5), Bensimon fails to explicitly disclose a method in which at least part of the absorbed molecule is dislocated across said surface layer relative to said support via an external force.

Shu discloses a method of polymer manipulation, in which an absorbed polymer is moved across a surface via a scanning force microscope tip in contact mode to a second conformation different from a first conformation of said absorbed polymer (pg. 4804, and fig. 1-2).

At the time of the invention, it would have been obvious to one skilled in the art to combine the polymer manipulation step of Shu with the method of Bensimon in order to distinguish single macromolecules from loosely bound aggregates and additionally because all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

Regarding claim 2, Bensimon in view of Shu discloses a method, wherein the method comprises a step for subsequently fixing the polymer molecule on the surface layer (col. 4, l. 8-10).

Regarding claim 3, Bensimon in view of Shu discloses a method, wherein the method comprises a step of dislocating in said adsorbed state the polymer molecule across said surface layer by manipulation of said first conformation of the polymer molecule to a second conformation different from the first conformation of the polymer molecule (col. 2, l. 21-24 and fig. 6), and fixing the polymer molecule on the surface layer in said second conformation by means of said molecular interaction between the polymer molecule and said support (col. 3, l. 54 – col. 4, l. 10).

Regarding claim 4, Bensimon in view of Shu discloses a method, wherein the method comprises steps of dislocating the polymer molecule in said adsorbed state across said surface layer by changing said first position of the polymer molecule to a second position different from the first position on the surface layer (col. 2, l. 21-24 and fig. 6), and fixing the polymer molecule on said surface in said second position by means of said predefined molecular interaction between the polymer molecule and said support (col. 3, l. 54—col. 4, l. 10).

Regarding claim 5, Bensimon in view of Shu discloses a method, the method further comprising a step of configuring said surface layer to provide a force required for dislocating the polymer molecule across said surface layer (col. 3, l. 54 – col. 4, l. 10). It is inherent that the force is smaller than about 2 nN due to the fact that the surface layer and substrate claimed (claims 19-21) are the same as those disclosed in Bensimon in view of Shu (see rejections of claims 19-21 below) and that the same materials inherently possess the same properties.

Regarding claim 6, Bensimon in view of Shu discloses a method, wherein the step of providing said surface layer on said surface of said substrate comprises a step of forming further binding sites in said surface layer (see “anchor DNA”, fig. 2, and col. 5, l. 64 – col. 6, l. 3).

Regarding claim 7, Bensimon in view of Shu discloses a method, wherein said external force comprises an attractive force provided at least partly by said further binding sites in said surface layer (col. 4, l. 56-61, and col. 5, l. 64 – col. 6, l. 3).

Regarding claim 8, Bensimon in view of Shu discloses a method, wherein said surface layer is self assembling (col. 6, l. 25-30).

Regarding claim 9, Bensimon in view of Shu discloses a method, wherein said step for providing said surface layer on said surface of said substrate comprises a step for using a Langmuir-Blodgett technique or a self organized film technology (col. 6, l. 25-30).

Regarding claim 10, Bensimon in view of Shu discloses a method, wherein the method further comprises a step for altering said predefined molecular interaction between the polymer molecule and said support (col. 3, l. 54 - col. 4, l. 10).

Regarding claim 11, Bensimon in view of Shu discloses a method, wherein said step for altering said predefined molecular interaction comprises a step for placing said surface layer with the polymer molecule provided thereon into a liquid medium (col. 3, l. 54-61).

Regarding claim 12, Bensimon in view of Shu discloses a method, wherein said step for altering said predefined molecular interaction comprises a step for drying said surface layer with the polymer molecule provided thereon. Shu teaches drying polymer on said surface layer in order to immobilize molecules (pg. 4803, last paragraph).

Regarding claim 13, Bensimon in view of Shu discloses a method, wherein said step for altering said predefined molecular interaction comprises a step for changing a temperature of said surface layer (see “temperature variation”, col. 12, l. 6-26).

Regarding claim 14, Bensimon in view of Shu discloses a method, wherein said step for altering said predefined molecular interaction comprises a step for applying an electric field oriented at a certain angle with respect to said surface of said support (see “electrophoresis”, col. 12, l. 6-26).

Regarding claim 15, Bensimon in view of Shu discloses a method, wherein said step for altering said predefined molecular interaction comprises a step for exciting the polymer by light (col. 2, l. 1-3, and fig. 1).

Regarding claims 16-17, Bensimon in view of Shu discloses a method, wherein said external force is provided by using one of the following fields: electrical field, magnetic field, optical field, and mechanical field, or any combinations thereof (see “scanning force microscopy” in Shu, pg. 4803)

Regarding claim 18, Bensimon in view of Shu discloses a method, wherein the polymer molecule comprises a polynucleotide such as DNA or RNA, a polypeptide such as protein, an antibody or antigen-antibody system, a polysaccharide, or a desired mixture of biomolecules (col. 3, l. 24-26).

Regarding claim 19, Bensimon in view of Shu discloses a method, wherein said surface layer comprises an inorganic polymer, an organic polymer, an organic low molecular substance, a metal, a metal oxide, a sulfide, a semiconductor, or an optical element, or any combinations thereof (col. 3, l. 8-12).

Regarding claim 20, Bensimon in view of Shu discloses a method, wherein said substrate is atomically flat (see “mica”, col. 3, l. 14). It is inherent that mica is formed of atomically flat sheets of silicate material.

Regarding claim 21, Bensimon in view of Shu discloses a method, wherein said substrate comprises glass, surface oxidized silicon, gold, molybdenum sulfide, highly oriented pyrolytic graphite or mica (col. 3, l. 13-14).

Regarding claim 22, Bensimon in view of Shu discloses a method, wherein the method comprises a step for anchoring at least one end of the polymer molecule to said support (col. 3, l. 24-26).

Regarding claim 23, Bensimon in view of Shu discloses a method, wherein the method comprises a step for anchoring at least one end of the polymer molecule to be arranged to a fiber, a micro-particle, or a nano-particle (col. 3, l. 16-21).

Response to Arguments

6. Applicant's arguments, see communication, filed 6 April 2009, with respect to the rejection(s) of claim(s) 1-23 under 35 U.S.C. 102(b) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Shu et al., “Extremely

Long Dendronized Polymers: Synthesis, Quantification of Structure Perfection, Individualization, and SFM Manipulation", *Angewandte Chemie*, Vol. 113, no. 24, pgs. 4802-4805 (2001).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DIRK BASS whose telephone number is (571) 270-7370. The examiner can normally be reached on Mon - Fri (9am-4pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vickie Kim can be reached on (571) 272-0579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

4/29/2009

/Yelena G. Gakh/
Primary Examiner, Art Unit 1797

/DRB/
Dirk R. Bass